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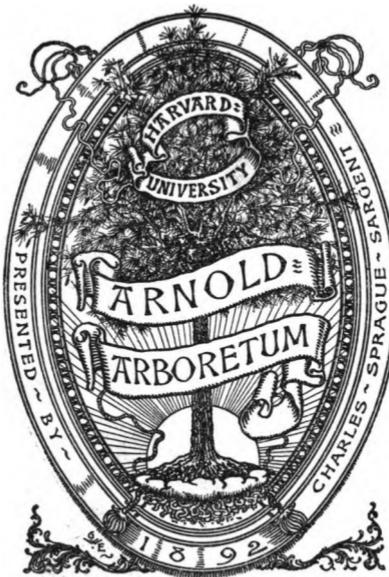
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CAPE OF GOOD HOPE.

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**BRITISH
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BRITISH NATIONAL FORESTRY.

The following paper by Mr. D. E. Hutchins, Conservator of Forests, Cape Town, was recently read before the Society of Arts, London, and for which its author has been awarded the Society's Silver Medal :—

" Some years ago, when last on leave in England, I climbed one of the highest of the Welsh mountains, and gazed with sorrow on the prospect around. Barren heather-clad hills bounded the view on every side, affording, I was told, but a scant pasturage for the few lean flocks of sheep I had seen on its slopes. It was an ideal forest country. Old records and names indicate more or less exactly where the forest once stood. The climate is a superb one for forests. I can readily imagine the close, clean, mast-like stems it must have produced. What would we not do with such a range of country in South Africa ?

Now it pastures a few sheep ! Sheep that could be pastured better in Australia or in South Africa, where it is too dry or hot to grow coniferous timber. When the old forest was cut down the usual soil deterioration followed. What was once a rich forest soil is now barren moorland. The contrast was all the greater as I had come straight from a tour in the Black Forest in Germany, where the reverse side of the picture is strikingly presented. There almost every square yard is utilised. In the fertile bottom lands of the valleys, sheltered and enriched by the forest, are villages, hamlets, cultivated lands and factories. Factories, worked by water from forest streams, where the air seems as clear and pure as on the Alps. Above and all around, stretching over an apparently limitless expanse of rolling hills, lies the glorious forest, natural in its beauty, artificial in its productiveness. In the valleys are the Spas, whither flees the German in summer as the Englishman to his seaside watering place. Few would hesitate which to choose if there were forests in England. Surely the æsthetic side of forests would have some influence on a not too artistic national character ! I know of no reason why there should not be another "Black" forest on Dartmoor or Exmoor. Nor why we should not see in England that fair landscape of sea and forest that has rendered Knysna famous throughout South Africa. Is there any valid reason why many as fair a scene should not be reproduced in England to-day ? It is my object in the following pages to submit certain facts bearing on this important subject, facts well worthy of earnest consideration at the present time. If England and the British Isles are to be restored to their former beauty and productiveness, Reforesting is essential.

A quarter of a century spent in the administration of national forest estates in India and the Colonies enables me to affirm the proposition with some confidence, that the great want of England at the close of this nineteenth century is National Forestry.

STATE FORESTRY IN ENGLAND AND ABROAD; ITS COST AND SUPERIORITY TO PRIVATE FORESTRY.

Let me at the outset clear the ground by saying that the forestry for which I plead is not the necessarily fitful efforts of a few private landowners, nor the founding of quasi-chairs of forestry at certain agricultural schools; but the National Forestry of a powerful Government department, properly manned and officered with scientific men; a department which, with a million pounds sterling to spend yearly, should work steadily at the formation of national forests, in the sense in which this term is understood in most other civilised countries, but especially on the continent of Europe.

There seems to be a consensus of scientific opinion in England now that National Forestry should be taken in hand as a national work, and prosecuted as a sacred obligation to posterity, as far above party politics as is the national credit and payment of interest on the public debt.

The way to this end is perfectly clear. Of all the means that have been tried in various countries, but one has given permanent results. A distinct branch of the public service must be formed. It must be gradually built up of professional forest men, specially trained and educated to their work at schools and universities, such as the Government of India now maintains at Cooper's Hill and Dehra Dun. Forestry would have to be added to the curriculum at every technical school; then the spread of education would rapidly put an end to such a sad farce as the present state of the historical New Forest in Hampshire. There one sees nearly 100 square miles in the heart of fertile England, solemnly condemned by a special Act of Parliament, to perpetual waste and mismanagement. It is as if the Legislature were to itself attempt to treat an intricate medical case; a case, too, that requires a different treatment at every stage, and a treatment that must be gradually varied as skilled experience is gained.

It is difficult for the inhabitant of an inland country, such as the Transvaal or Switzerland, to realise all that is meant by the sea, sailors, fishermen, a navy, and naval men. I have constantly experienced the same difficulty in speaking to Englishmen of forests, forestry, foresters, and forest officers. To the average Englishman a forest is simply a collection of trees, at best badly grown trees. The English parks throw him off the scent. Speak to him of a forest officer, his mind runs to a park keeper or gardener. Of all that is meant by a close, clean, high-timber forest; of its peculiar condition of soil and climate, its varied requirements and skilled treatment, he is as ignorant as a Chinaman of electricity. There is not a forest scene by an English painter in the National Gallery, and very few by foreign painters!

I have in my hands the prospectus of a West Australian forest company, and the report attached of an unprofessional gentleman sent out to report on the forest. It contains an error sufficient to wreck the concern. Will it be believed that no expert literature in English exists on any of the Australian forests, vast though they are, and estimated to be worth many hundred million pounds sterling? In spite of the protests of an enlightened and far-seeing few, little is thought of but forest destruction, with or without some return in money. The wanton destruction of the unique Kauri forest in New Zealand is one of the saddest spectacles on this fair globe of ours. Kauri is a class of tree that will never be replanted; while the forest, as a whole, could be worked conservatively nearly as profitably as it is now being destroyed. Broadly speaking, when as a colonist the Englishman goes abroad he proceeds, like the Spaniard in Mexico, to destroy as a nuisance the forest that he encounters. He calls the forest "bush" in Australia and South Africa, and "jungle" in India. Timber was expressively christened "lumber" in America. As was justly observed by a recent eminent writer:—"In not one of the English colonies is the forest question seriously considered, if we except India and Cape Colony." A variety of circumstances led up to the conservation of the forests of India; the genius of one German (Sir Dietrich Brandis) founded the Indian Forest Department, the only complete organisation of its kind among English-speaking people. The Cape Forest Department owes its formation and usefulness mainly (I fear it must be confessed) to the fact that half of the European colonists at the Cape are *not* of English extraction. The neighbouring colony of Natal, the "English Colony" of South Africa, after the temporary employment of an able forest officer from the Cape, and an exceptionally good professional man from Germany, has now gone the way of other English colonies. Three-quarters of its rare indigenous forest is hopelessly destroyed, and the remainder, now under only nominal conservation, is fast disappearing.

Along with the training of a body of professional English forest men there would, of course, be required an annual vote for the formation and tending of the national forests. For many years the largest portion of this vote would be expended on formation, i.e., in the planting and acquisition of suitably situated forest lands as these came into the market. In this way the national forest estates, the glory of generations of Englishmen yet unborn, would be gradually built up. The present low price of land in the British Isles offers exceptional advantages for the early initiation of such a scheme. France spends yearly somewhat over £500,000 sterling on its forests. Of this, about one-half is expended on forest officials and their education. In Germany relatively more is spent on forest work, as the wood is there felled by departmental agency and brought to the roadside. The total value of the German forests is reckoned at £900,000,000 sterling, capitalising at 2½ per cent. on an annual out-turn of 60,000,000 cubic metres, valued at from £20,000,000 to £22,500,000 (Professor Gayer).

Coming to a British colony, the yearly budget provision for forest work at the Cape amounts to upwards of £60,000, which is somewhat over 1 per cent. of the total yearly expenditure of the colony.

If England were to re-forest at the same rate proportionately, 1 per cent. of the national expenditure would represent an amount of about £1,000,000 sterling as the annual forest budget. If this sum were voted annually by Parliament it would suffice for re-foresting yearly about 100 square miles, or say the present area of the New Forest in Hampshire, taking planting and fencing at £5 per acre, and the average cost of the land purchased at £10 per acre. While much of the land required for re-foresting—sand, mountain and moor—could be obtained at very low rates, other land that it is desirable to re-forest would cost £15 or £20 per acre. This is a work to be undertaken in the prosperous days of a country's history. The report of the recent Recess Committee on the Establishment of a Department of Agriculture and Industries for Ireland estimated that to re-forest 3,000,000 acres in Ireland would cost £20,000,000 sterling. No doubt Ireland alone is capable of producing one-half the present importation of wood from abroad into the British Isles. The present percentage of woodland in Great Britain and Ireland is 4 per cent.; while in Cape Colony, with its wide, treeless plains, forests cover only $\frac{1}{2}$ per cent. of the whole area. While some of the Colonies are in the position of having more forest than they want or than is desirable, the proportion of woodlands to open country represents in the mother country a miserably deficient quantum. If we look at the position of Great Britain and Ireland among the States of Europe it will be seen that in forestry it occupies the lowest place, standing below all the European States. It is even 1 per cent. worse off than Portugal. In Germany 25 per cent. of the country is wooded. This is the proportion that is considered usually desirable in a well-regulated country. The percentage of woodlands in the British Isles would be raised by 7 if there were planted the 10,000 square miles or thereabouts required to produce at home the present importation of wood and forest produced from abroad. The following is the proportion of woodland in some of the more important European States:—*

	Percentage of Woodlands.	Scientifically conserved and per- manent.
Russia in Europe	... 36	
Austria	... 30	
Germany	... 26	
Switzerland	... 19	
France	... 17	
Portugal	... 5	
Great Britain and Ireland	... 4	Parks, small plantations, &c.

France has one colony in a temperate climate comparable to the

* Schlich and Nisbet.

Cape and Australia—viz., Algeria. Here the Forest Department was inaugurated along with other branches of the public service as soon as the country was settled ; and Algeria has to-day about 8,000 square miles of State forest managed by the Forest Department, about the same area which cannot for political reasons at once be brought under forest management, and a further area of about 1,500 square miles of private and communal forest, partially managed by the Government Forest Department. Altogether it is estimated that 5 per cent. of the area of Algeria is wooded.

Nearly one and a half millions are spent yearly on foreign missions. This expenditure is of a sacred nature, but so are trees to those who live in the forest and study its laws and well being. We want missionaries to go abroad amongst people who know not the forest, missionaries who should speak of its ennobling qualities, its beauty, and its necessity on God's earth. It is a curious reflection that if a like sum were spent yearly in reforesting in Britain, the desecrated land would be restored to its former glory in three generations. Take one item, the rubbish heaps from the mines in Cornwall and the Black Country. A distinguished forest officer lately formulated a perfectly feasible scheme for afforesting these. I have not heard that any mining owner, wealthy though they mostly are, has yet planted an acre. A mine owner expects some better return than a doubtful 2½ per cent. on his outlay. Nor is he usually content to wait till his grandson's time for this poor and uncertain return. There is too often an element of uncertainty in the return from small private plantations. The State should do this work. Some one will object that the rubbish heaps are private property, and as such are sacred. Doubtless ; but they are also a national eyesore. The Legislature should deal with them as the French do with their sand-drifts. If the owners cannot or will not afforest, let the State do it, retaining always the management by its own forest officers, but paying to the owner the difference between revenue and cost of management.

Similarly with municipal or other forests owned by any public corporation, such as a County Council. These must be managed by the Government forest officers to ensure the requisite continuity and stability in the operations. This proposition may sound bureaucratic and repugnant to English ideas of local self-government ; but it is a matter that has been thoroughly threshed out on the Continent of Europe, and the same conclusion arrived at by such differently complexioned States as Germany, Austria, France and Switzerland. Corporate forests thus managed are but little inferior in condition and yield to those owned by the State. All net revenue is of course paid to the corporate owner.

Forests in Europe fall into three classes :—

- (1) Those owned and managed by the State.
- (2) Those owned by corporations, but managed by the State.
- (3) Those owned by private individuals.

Forestry in England is in the peculiarly unfortunate position of

only being represented by usually ill-managed woods of the third class. No useful purpose would be served by attempting to palliate this fact, or by citing brilliant exceptions to the contrary. The planting in the Scotch Highlands should receive public recognition. I have heard of a landowner in South Wales who has planted 10,600 acres of larch, and of a large English landowner who has obtained the services of a German expert to draw up a scientific working plan for his woodlands. Such exceptions cannot in the nature of things last long. There is rarely a guarantee that they will last beyond one lifetime. It would be one of the functions of national forestry to assist private forest enterprise in every way; not to supplant or forestall it. State forests worked at long rotations would supply the large clean timber now imported from abroad. Private forests, on account of the necessary length of rotations, cannot do this; they would continue to supply pit-props, poles, sleepers, and special timber, such as figured ash, hedgerow elm, &c.

Compared with State forests, private forests are at a disadvantage on these three points:—

(1) *Changing Ownership*.—The careful landowner may have a spend-thrift son, or one of different tastes. The estate may have to be sold for various reasons. This usually entails a rupture of the working plan, together with the scientific working of the woodlands.

(2) *Interest on Borrowed Capital*.—The State can raise loans at 2 per cent. interest. The private forest owner would have to pay double this, or more, on the uncertain security of a private forest.

(3) *Cost of Management*.—A large forest estate can be more economically managed than a small one.

Thus we arrive at the curious fact (in sharp contrast to the general position) that forests are better and more profitably worked in the hands of Government than by private owners.

The assistance rendered by Government to private forest owners in Europe (and latterly America) takes the form of grants of young trees free, or at cheap rates; advice in drawing up working plans; and last, but not least, the example (which is better than precept), of scientifically managed forests yielding good returns dotted throughout the country.

IMPORTED WOOD AND THE AREA REQUIRED TO PRODUCE IT IN ENGLAND.

England imports practically the whole of her wood—a necessary of life. This is in itself a bad position to anyone but a rabid free-trader. Worse than this, though, foreign supplies are becoming exhausted. Wood must rise in value, and taking a century or more to produce, timber forms an exception to the ordinary laws of supply and demand. The time is not far distant when every civilised country will want all the wood it can produce. Germany, Austria, France and Switzerland have scientifically managed national forests, but

these will not do more than satisfy part of their requirements in the future.

The timber and forest produce imported into the British Isles, and that could be produced equally well in this country, represent a value of about £20,750,000 sterling.

Importation of Wood Producible in Britain.—The last returns published by the Board of Agriculture give the following figures for 1896 :—

Fir	...	...	...	...	£16,000,000
Oak (including staves)		...	...	...	1,500,000
Various	...	...	...	...	1,649,000

If we take one-third of the last figure as producible in Britain, we have a total of £18,000,000, for imported timber producible in Britain. This is exclusive of nearly a million's worth of manufactured house and furniture wood, of which nearly the whole comes from Europe or North America, and is producible in England. It is exclusive, also, of £1,750,000 for wood pulp; of tar (mostly Russian), £74,000; rosin, £419,000; turpentine, £493,000 (both nearly all from U.S.A.); or home producible timber, rough and sawn, £18,000,000; manufactured, £1,000,000; forest produce about £3,000,000, of which £1,750,000 for wood-pulp is certainly producible in Britain; total timber and produce, certainly producible in England, £20,750,000. A curiosity of forest produce importations is £114,000 for moss and forest litter.

At ordinary rates of yield this would require about 9,000,000 acres for its production—9,000,000 out of 77,750,000 acres, the total area of the British Isles. This is not quite 1 acre of forest to every 8½ acres of open country. Germany has 1 acre of forest to every 4 acres of open country.

Compare this £20,750,000 with £25,000,000, the present cost of the National Debt, or £24,000,000 the Army. Our forest improvidence costs us nearly as much as our National Debt!

The question as to the quantity of land available for reforesting in Great Britain and Ireland is discussed by Dr. Schlich in his admirable "Manual of Forestry," of which the final volumes have been recently published. And his conclusion is that the moors, mountain land and waste land generally, added to the area which is at present more or less imperfectly wooded, are large enough to yield easily all the timber and forest produce now imported. The Recess Committee a few years back reported that Ireland alone has 3,000,000 acres available for reforestation. Geographical text-books tell us that one-fourth of the area of England is waste, i.e., neither arable nor permanent pasture land, and that in Wales not much above half the land is in pasture or under cultivation; while in Scotland only about one fourth the area is arable. Ireland, like England, has about one-fourth of its area waste, i.e., neither cropped nor meadow land. Altogether, the cultivable area of the United Kingdom is little above one-half (58 per cent.) the total area, thus leaving ample room for forests.

Recently, when discussing the forest question with a prominent member of the present Government, I was met by the assertion that the British Isles are too densely populated to produce at home the present sea-borne timber. This, however, though a common popular error, is far from being the case. Only to cross the Channel, there is the example of Belgium with a denser population than England and better forest. Indeed, it may be useful to glance briefly at what Belgium, with a population the densest in Europe, is doing to improve its forests.

Belgium pays nearly £3,000,000 for imported wood, and produces £4,000,000 worth yearly from its own forests. Strong efforts are being made to improve the forests and reduce the imported wood. A considerable sum is set apart every year by the State for the acquisition of waste lands or ruined forests; and it pays one-third of the cost of planting up large areas of village waste for the benefit of the communes concerned. There is a Central Society of Forestry, consisting of 900 members belonging to all classes, from the King and his Senators down to small landowners and their agents and even tradesmen. The society endeavours to spread a due understanding of the objects and benefits of sylviculture by means of a journal, by public conferences and trips to the forest, and by free advice.

But Belgian forest work is quite recent. As late as 1884 the forests were being mismanaged and alienated. Shortly afterwards an independent forest administration was established under a director, and in 1893 the "Conseil Supérieur" was added. This consists of at least twenty-four members, representing different districts, and competent to advise on all forest questions. In 1895 the game and fishing laws were brought under the forest administration. The forest area of Belgium comprises: public, about 500,000 acres; private, 1,250,000.

The private forests are thus about one-sixth the total area of the country. Belgian forest officers were formerly trained at Nancy or Tharandt, but they are now put through a three years' course in Belgium.

The areas that suggest themselves for extensive reforesting operations within the British Isles are the mountains of Wales, the English Lake Country and the Scotch moors and Highlands; the "downs," so common everywhere; together with the wolds and other areas where the forest has been destroyed in recent times—the Yorkshire and Lancashire Wolds, the Cotswolds, the Weald of Kent. (The word *wold* comes from the Anglo-Saxon *weald*, and is the same as *wald*, the modern German for forest.) Then there are the now barren and almost waste English moors; desolate Exmoor; the wet tor-crowned tableland of Dartmoor; the bleak Yorkshire moors; the peaty Lancashire moors, also the bogs of Ireland. The reforesting of the moors and bogs would not be so easy as work on the mountains and wolds. With the destruction of the forest has gone the rich forest soil and forest drainage. Much of the reforesting of the moors and bogs would have to be left to the gradual operations of

nature, neighbouring plantations affording shelter, drainage and seed. Darwin, Ruskin, and various English writers speak of the wonderful power possessed by Scotch pine of gradually spreading itself, self-sown, over adjoining waste lands. Cluster pine has the same power in the more temperate fertile parts of South Africa.

But, wherever possible, wherever the price of land be not too high, the future State forests should be located near the great centres of population, on account of markets and the bulky nature of wood and woody produce; for the health and recreation of the people; and, as regards London and other important centres, for defensive purposes. Consider the beautiful forests in the neighbourhood of Paris.

DECLINE OF BRITISH AGRICULTURE MET BY THE RISE OF BRITISH FORESTRY.

Looking into the future, although little encouragement is discernible for British agriculture, for British forestry the prospects are brighter. The present low price of English timber need not be seriously considered. Its inferiority is admitted on all sides. Its exclusion is specified or implied in nearly all building contracts. Till lately it was legally excluded for building timber under the Lands Improvement Act. British coniferous timber is used only for rough work and is too often a drug in the market. This inferiority has nothing to do with climate. It is solely due to bad forestry. The German and French forest officers who have visited England tell one tale; and there is not a shadow of doubt on this point, that good forestry in England would produce timber equal to any that could be imported. To a forester this is so certain that it need only be mentioned here. A more important point to consider is the diminution, in the future, of supplies from abroad, and the consequent increased demand for home-grown timber. Here English forestry could not wish for better prospects. The vast forests of North America are disappearing by leaps and bounds. Though much has been written and said about forest conservation, only a beginning has been made in the reservation of the national forests. It is more than probable that forest destruction in North America will not be arrested until no more forest is left than is required for home consumption. The forests of Russia are in similar case. The same may be said of the forests of Sweden and Norway, which are largely in private hands, and are going the way of private forest all the world over. The forests of central and northern Europe will not in future suffice for more than local demands. As regards competition with home timber, tropical forest, and the forests of the temperate regions in the southern hemisphere, may be left out of account. They may send a little hard wood, in spite of the distance, to compete with oak, and for special uses, such as street paving; but remembering the fact that about nine-tenths of all the wood used in civilised countries belongs to the pine or the coniferous class, and that the supplies of this wood come, and must come, almost entirely from the cold temperate regions of the northern

hemisphere, it will be seen that English forestry has in the future little or nothing to fear from foreign competition.

Compared with English agriculture English forestry has these two further advantages :—

(1) *The Bulky Nature of Forest Produce.*—Wheat, frozen meat, fruit, skins, &c., can be brought at moderate expense from the Antipodes. But long carriage by sea or very short carriage by land soon renders the cost of imported wood prohibitive. Rafting such as one sees on the Rhine and on the Baltic rivers is out of the question in the temperate regions of the southern hemisphere. In the tropics the rivers are usually fitful, being dependent on heavy periodic rains, and though of course there are navigable and raftable rivers, the number of these in proximity to workable forests is not great. There is the further difficulty in the tropics that most of the woods are too heavy to float and require to be buoyed up with bamboos.

(2) *Cheap Money.*—The low current rate of interest on loans has a beneficial, but only a comparatively small influence on agriculture, where some return on the capital invested is usually obtained within a year or two. In forestry, owing to the long-deferred yield, a low rate of interest on money is an all-powerful favourable influence. Forest estates rarely yield more than $2\frac{1}{2}$ or 3 per cent. The produce per acre runs into big figures, both of yield and money, but the length of time required to obtain this yield reduces to 2 or 3 per cent. the interest on the capitalised value of the estate. The public funds have now sunk to a lower rate of interest than that yielded by forest estates. Consols to-day yield only 2 per cent. I can remember the time when 5 per cent. was usual, and was considered a fair rate of interest for safe investment in England. Five per cent. has since gradually fallen to the 3 or $2\frac{1}{2}$ per cent. of to-day. This steady fall in the current rate of interest on capital, and the equally steady destruction of extra-European forests combine to render British forest estates in the future a more remunerative investment. The fall in the rate of interest tells most in favour of State or national forestry, because (1) it is the State that is chiefly concerned in the production of large timber at long rotations; (2) it is the State that commands money at the lowest rates of interest—to-day 2 per cent.

Thus, although forestry and agriculture are at present in an equally depressed condition in Britain, the prospects of forestry in the early future are as bright as those of agriculture are sombre.

The present bad quality of British timber is solely due to bad forestry. Foreign wood must become dearer, and gradually rise to famine prices. The cost of transporting a bulky material such as timber must always tell largely in favour of home produce. The fall in the current rates of interest on capital renders British State forestry remunerative to-day, for the first time in history.

THE RURAL POPULATION BENEFITED BY THE RISE OF BRITISH FORESTRY.

Land in the British Isles is going steadily out of cultivation; the rural population, the backbone of the country, is steadily declining. To

a visitor absent for many years from England, this is quite the saddest feature of modern developments.

As compared with pasture the area under crops in the United Kingdom is an ever-diminishing quantity. In Great Britain about one-half the arable land is under crops. In Ireland there is little more than one-sixth. Though this decrease of cultivated land may represent a small economic gain in the increase of England's unique grass lands, the loss of rural population has a serious national aspect which can hardly be qualified otherwise than as a national disaster. In this statement I think I have with me all those who have seriously studied the population statistics of these islands. To remedy this serious and growing evil there occurs nothing so practical as national forestry.

Dr. Schlich calculates that if the 9,000,000 acres required to produce the present forest imports, were to be planted at the rate of 300,000 acres yearly, at least 15,000 labourers, corresponding to a population of 75,000 people, would be employed; and that at the end of thirty years, when the 9,000,000 acres had been fully planted up, permanent employment in the forest would be given to, say, 150,000 labourers, representing a population of 750,000 people. A further large rural population would be provided for by the various forest industries attendant on the formation of forests. I have in my mind a prosperous German hamlet following the happy thought of one man (and he a peasant) to plant osiers. In Germany it is estimated that the wages of people employed on forest industries amount to something like £30,000,000 sterling, and that roughly 12 per cent. of the total population of Germany is employed in the forest and out of the forest. About 1,000,000 people in the forest, i.e., directly employed in working the forest estates, and about 3,000,000 out of the forest, i.e., in working up forest produce, chiefly timber, into the various articles manufactured from wood.

Certain forests are maintained in Germany for the support of certain industries. Without the forest the industries would exist with difficulty, or go to some other country. The Spessart forest is a case in point. Here is a fine old oak forest deliberately worked by the Bavarian Government *at a rotation of 300 years*. Of course, with such a long rotation there is an enormous sacrifice of interest on the capital locked up in these old trees. But the trees are Durmast oaks of slow growth and very fine grain. A regular supply of this wood is necessary to the well being of important industries in the villages around. So far has the State conservation of these trees been carried that some of the trees now being gradually and methodically worked through are as much as 450 years old. The plan of operations, technically termed the "working plan," was framed in 1888 and runs to the year 2007.

As customary, the whole forest has been made the subject of close examination and careful calculation by a special commission of forest officers. Starting with the postulate of a sustained yield, they have laid down how and when each group of trees is to be felled, up

to the year 2007. The very old trees—too old to have any volume or value increment, might now be sold (says Sir D. Brandis in a recent review in "Nature") for about £150,000.

It will at once be said that the maintenance of such trees is utterly opposed to modern principles of political economy. Quite so. The loss of interest on the oldest of them costs Bavaria £27,000 a year. But German public opinion rightly considers that the forests and village industries are worth this, and more also.

PHYSICAL DEGENERATION OF THE RACE.

The prudent foreigner, looking across his wooded mountains, will tell you that England is rich and can well afford to pay in the future for her present forest improvidence. There is more than this in the forest question, and to my mind it is quite the saddest aspect of it.

Great Britain now pays about £20,750,000 annually for imported wood and forest produce that could be produced equally well in the British Isles. Broadly speaking, this wood is paid for by manufactured goods produced by the labour of the factory operative, that physically degraded type of humanity one sees in all big manufacturing towns. With the destruction of the forests in England have gone the stalwart men who once worked in them; to be replaced by the factory hand—weak-lunged, knock-kneed, and sallow. One has only to travel through the forests of the Continent of Europe and then visit a few of the large manufacturing towns of England, to have this physical degeneration of the race brought home in the most forcible and unpleasant manner. The wood industries are mostly healthy (to a great extent out-of-doors) occupations, and they usually employ a robust country population living partly on the forest and partly on their gardens and small agricultural allotments. But let us consider the one million people that in Germany live and labour in the forests. What a reserve of national strength! They are fairly, most people would say sufficiently, educated; and their healthy life in the open air and constant exercise preserves a physical development, a strength of frame and constitution, that is rare in these days of machinery and easy chairs! Judging from what I saw at a recent visit to the forests of Germany and the big towns of England, I should say that England could better afford to pay £20,750,000 for foreign wood than to lose the broad-shouldered and muscular men who once worked in her forests. These are the men whom we value as colonists—men fitted to go forth and subdue the waste places of the earth.

Not long ago an old Cape Colonist remarked that the Englishman of to-day was only fit to drive a steam-engine. From a certain point of view there was truth in the remark, and no doubt the steam-engine has had something to do with that degeneration in the frame and sinews of the race that is sufficiently remarkable. Town life and modern athletics are producing—at least, so it strikes an "Uitlander"—a small race, sprinkled, doubtless, with a percentage of active, wiry men. But the big men of square frame and massive strength

are increasingly rare. Few inquiries would be more interesting than a comparison of the average muscular power of the men and women of to-day with, say, Edward III.'s archers. How small a percentage of English women nowadays know aught of healthy out-door labour. One is immediately struck by the difference on going to Scotland. The modern English woman considers out-door labour in the field and garden a disgrace. Just as the effeminate clerk looks down on the artisan, so does the sickly, shrunken household drudge on her brawny sister of the field—would I could say, and forest. The charm of Hardy's shapely "Tess" lay in her old-world out-of-door life. The graceful, shapely Kaffir woman loses her form and amazing constitution when she adopts English habits and ceases to labour in the field.

It is a curious fact, and one that affords food for much reflection, that the European who came to South Africa 200 years ago is, in frame and bulk, the physical superior of the average European of to-day. In spite of a warm and somewhat enervating climate, he has escaped the dry rot of town life. Put him to work in the field with the German or Italian peasant, and he is soon distanced. Put him behind the counter. He is not smart. But stir him up with an average European crowd, and his sturdy build betrays him at a glance.

Thus we see that national forests have an important bearing on national health and the physical degeneration of the population. To the town-dweller, national forests will supply public parks and recreation-gounds ; to the countryman a means of livelihood in the country.

FORESTS AS RECREATION-GROUNDS.

The national forests contemplated above, viz., 9,000,000 acres required to produce at home the timber now imported from abroad, would amount to an average area of about one and a half New Forests to each county. These would be national forests, and, in every sense of the word, national playgrounds ; as are the national forests on the continent of Europe. Such forests spread over the length and breadth of the land would be the pride of every county. As public property they would be open to everyone, for everyone's use and enjoyment. Their important bearing on the health and enjoyment of the community needs no comment.

Let no one take fright at the mention of the New Forest. The management has been compared to that of a pilot endeavouring to sink his ship, and if one may believe what has recently appeared in the public prints, there may be a good deal of truth in this playful comparison.

In any system of national forestry the State forests would be entirely free from those servitudes that have been allowed to grow up and nearly ruin the New Forest. There would be no walled-in enclosures, no part of the forest where every one could not go and enjoy God's earth in its wildest and most beautiful aspect to his heart's content.

MILITARY ASPECT. FORESTS A MEANS OF DEFENCE.

It is certain that forests in England would assist defence in case of invasion. In a forest disciplined troops are at a disadvantage. This has been seen in every Kaffir war in South Africa, only too sadly in the fighting with natives more recently in the Matoppo Hills. In the Pirie forest a handful of ill-armed fugitives kept at bay a powerful English army well found in artillery and native auxiliaries. Here discipline was not only useless, but worse than useless. In the forest the colonial irregulars and native levies had actually to fight for and protect the regulars. It is chiefly from behind cover that the Boer marksmanship is described as being so wonderfully accurate. The ancient forests of Britain gave Caesar as much trouble as the ancient Britons. Forests played an important part in the American war of independence. It was largely by their aid that the raw colonial levies beat back the best disciplined soldiers of England. It is unnecessary to multiply examples. History is full of them. Forests, especially when the defenders have with them men who know the forest, always assist the defenders.

We have seen above that a scheme of national forestry would give employment to 150,000 men in the forest. No doubt these would be incorporated into a militia or volunteer corps for national defence. It is easy to see how invaluable such a corps would be in case of invasion. With a forest and foresters in every county, Great Britain would be studded with well-garrisoned fortresses. Forest, in these days of sharp-shooting and accurate rifles, helps the defenders far more than in Caesar's time. The foresters in France and Germany form a valuable military adjunct, where every man is trained as a soldier. How much more would they be worth here, where, in case of invasion, every disciplined man able to shoot, march and camp out, would be at a discount. A forest militia, too, would help the solution of that difficult military problem, what to do with the army reserve men.

No doubt the navy is our first line of defence, no doubt the people would rise as one man if invaded; but no prudent man would wish to see this wealthy country with only one line of defence ready. Consider the rich prize of London, the possibility of a naval reverse and a dash on the metropolis. There has been no naval conflict between first-class powers with modern ships and guns. Here is an element of uncertainty. A large proportion of our seamen are soaked in malaria contracted on tropical service (notably the moral slave-hunting fad on the east coast of Africa, and the immoral gin protection on the pestilential west coast). Malaria never quite leaves the subject. It lurks in him, and is liable to prostrate him at any crisis involving unusual fatigue or exposure. Our malarial seamen would be unfairly pitted against non-malarial seamen. Then again the elements are proverbially fickle. Storms might interfere with our torpedo destroying arrangements. Two or three "mill pond" days might land an enemy on twenty points of our coasts. Every considera-

tion of prudence demands a second line of defence *always ready* behind the navy. In the Franco-German war the Vosges mountains and forests were France's second line of defence, but the French were not ready to defend them and the Germans took them at a rush. In the last Russo-Turkish war, the Balkan mountains and forests were Turkey's second, and for long successful line of defence. Could the small regular army maintained in England cope with a sudden invasion at twenty different points? We doubted this in Napoleon's time. With the present huge continental armies and their growing navies there is still more reason to doubt it now!

It would seem advisable therefore to incur some comparatively small extra expenditure on a forest militia and the grouping of the national forests so as to form a second line of defence round vulnerable or strategic points. Thus London would have its cordon of forests and forts. Part of the extra cost of land near London could be set against the gain to the population of such grand national recreation grounds.

GAME.

Game and the fortuitous value it gives to waste and otherwise unproductive land has long been held to be an obstacle to forestry in Britain.

It was game that depopulated the Highlands of Scotland, and drove to Canada and elsewhere a race of men and women that should have been nurtured at home. Britain is the poorer for their loss, but Londoners have been saved the trouble of going abroad for their deer shooting, and our Highland regiments are recruited in Glasgow!

As regards game and forestry, I do not share the opinion of those who consider game and game-rents such a serious obstacle to forestry in the British Isles. The private landowner will prefer game to forestry because it pays him better, or, at any rate, sooner; but the private landowner is not of much consequence in forestry. His forest, as a rule, is badly managed, and in process of disappearance. Certainly, there are brilliant exceptions to this rule, in the Scotch Highlands themselves and among the German princes; but the general rule is undoubtedly true that in any scheme of national forestry the private forest is not of much account.

It is probable that in large national forests the loss of the present game rents would be little felt. Large game, such as one has in Germany, would come in with the formation of extensive forests. Wild boar, deer and capercailzie would replace the grouse, barn-door pheasants, and battues of to-day. I doubt whether even the balance at the poultorer's shop would, after a few years, be much to the bad. To the true sportsman the change would mean a return to more genuine sport. Nowhere is game more keenly and successfully preserved than in Germany.

NATIONAL FORESTRY SHOULD BE UNDERTAKEN NOW AS A NATIONAL
INSURANCE.

Scientifically-managed national forests would yield a percentage return on their cost higher than the present rate of interest on Consols. In other words, such national forests could be formed to-day at a profit, and they would hereafter represent a perpetual and permanent source of national wealth. The wealth and strength that Germany draws from her forests are astonishing. One passes through villages where the people live free of rates and taxes, with perhaps a spacious school-house or public library thrown in. All this "comes from the forest," they tell you. The German forests, as we have seen, are valued at nearly £900,000,000 sterling.

A country's forests rank with its soil, rainfall, population, minerals, accumulated wealth, and other assets, to raise or lower it in the scale of nations. The mineral wealth of England is being rapidly worked out. It cannot be restored. The forests have been worked out, but they can be restored. It seems difficult to imagine any point in the country's history more favourable than the present for restoring the forests. So good is the national credit, that money can be borrowed at 2 per cent. In the total tonnage of its shipping England bulks half as large again as the other eight great Powers combined. Other countries pay Englishmen about £100,000,000 yearly as interest on loans. The financial position of England is to-day supreme.

It would be unhistorical and foolish to imagine that this supremacy can always last. Germany, America, and perhaps Japan seem advancing more rapidly than ourselves. It is possible to imagine them overtaking us, underselling us, outbidding us. Now, in the days of our financial supremacy, is the time to restore the forests, to effect a national insurance against less prosperous times. To restore the forests would be to make the soil of Britain worth more by £150,000,000 or £200,000,000 than it is to-day. Trade might seek other channels, minerals become exhausted, the populace decline in energy and strength, the colonies fall away, but the forests would remain an unfailing source of national wealth, a livelihood for a large part of the physically best part of the people. We are paying off the national debt, we encourage national thrift in the Post Office Savings Banks, the growth of life insurance is remarkable; but national forestry is looked on as unnecessary. Is England to follow in the footsteps of Spain, Italy and Greece, where the forests were neglected in prosperous times, and the people had to take to hovels as soon as they became too poor to pay for foreign timber? Their deep poverty prevents them restoring their forests now, though they are fully alive to the necessity of doing so, and the loss of their forest enhances their poverty.

Germany, Austria, France and Switzerland have their national forests scientifically managed. Britain, alone among the great Powers, allows this vital question to sleep. The sooner the position is realised the less will be the cost of retrieving it, since we are paying

yearly £20,750,000 for foreign wood that could be equally well produced in these islands.

Lastly, when considering forests in the light of a national insurance for England, there is the curious fact that along with England's financial supremacy has come agricultural depression and the fall in the value of agricultural lands. These two facts taken together indicate the present as a unique period in English history for inaugurating national forestry.

COST AND YIELD OF NATIONAL FORESTS.

In considering the returns to be expected from National Forests it is easy to get astray in matters of detail. It would be unsound to generalise from figures drawn from private forests. It is particularly unsafe in the case of plantations, where the conditions vary so largely. Cost of land, cost of young trees, cost of fencing, the market, are necessarily very variable items in each case. We may learn that the very best land for planting in Scotland may be had for 50s. per acre, and that it can be fenced, drained and planted for £4 per acre, that some plantations in Scotland are scarcely paying expenses, that other Scotch plantations are yielding fair returns, that larch plantations in South Wales are paying handsomely for pit props, that good agricultural land in England is rarely obtainable under £20 or £25 an acre, and is commonly worth £60 or £100 per acre, and that there is sandy but good planting land to be had in Surrey for £8 an acre. On the whole, we may, perhaps, assume an average value of £10 per acre for the land required for reforesting, and £5 per acre for planting, fencing and draining. Thinnings would have little value in remote localities. Near London and centres of population every stick would be marketable. Approximately, and on an average, we might assume that the value of the thinnings would cover the cost of administration up to the epoch of the principal cuttings.

The returns for 1896 give the value of imported timber producible in Britain as over £20,000,000. Let us consider what would be the cost and profits of planting 10,000 square miles, calculated to produce about £12,000,000 worth of timber annually.

Let us assume an annual vote of £1,000,000 expended in buying ground, fencing, draining and planting 66,666 acres, or 104 square miles yearly at £15 per acre. This is calculated to yield timber and forest produce worth about £13,000,000 now, and, say, £16,000,000 in 73 years. Let us assume a rotation of 73 years. An expenditure of £1,000,000 now, would, at 2 per cent. compound interest, quadruple itself in 73 years. In 73 years, therefore, the capital of £1,000,000 would amount to £4,000,000. Thus on a 2 per cent. basis, with an expenditure of £4,000,000, we obtain timber worth £16,000,000.

If we assume £8,000,000 as the net value of the wood in the forest, that leaves a profit of 100 per cent., or (looked at another way) a return of 4 per cent. on the capital; but in any case the whole £16,000,000 would be spent in this country on the wealth and health of its people.

To reproduce the woods after the first rotation, natural reproduction would no doubt be largely employed; and the value of timber tending to rise, and consols to fall, the national forests would probably yield 5 or 6 per cent. at the next rotation.

The German forests actually return now from 2½ to 5 per cent. on their capital value.

ABATEMENT OF THE SMOKE NUISANCE.

One of the results of national reforesting in England would be an abatement of the smoke nuisance of towns. Let anyone compare the thin blue smoke, almost vapour, from a wood fire with the dense black sulphurous smoke from a coal fire. No doubt the smoke from wood fires varies much, and some forms of coal burn almost without smoke. If, however, we consider the average combustion of clean, well-seasoned firewood, and ordinary descriptions of coal, there is a vast difference in favour of wood. For many years I have held that herein lies the chief key to the difference between clean, bright Paris and grimy London. About 25 per cent. of the country round Paris is wooded. Consider the fine forest of St. Germain within ten miles of Paris.

If London were in such case, the necessary thinnings from the forest would furnish the poor with a firewood cheaper and more wholesome than coal, while in the dwellings of the rich, wood would be preferred on account of its cheerfulness and freedom from dirt. No doubt, to get sufficient heating power from wood, it would have to be used as it is on the Continent in suitable stoves. These may be close, with great heating power as in Russia and Germany, or open, as in Belgium and parts of France. In either case there would be a great gain of heating power over the present dirty open fireplaces. No doubt it is the combination of watery vapour and smoke that produces London fogs, and that the condensing watery vapour, especially during winter, must always be present in London. But I am convinced that the substitution of wood fuel for coal would give London a greatly improved atmosphere. *Roel Russel in a paper in The 19th century (Jan 1902) estimates the loss from London fogs at £500,000 per year.* REASONS AGAINST DELAY.

Let us briefly recapitulate the reasons against delay:—

1. £20,750,000 spent every year for wood that could be equally well grown at home.
2. Consols at 2 per cent.
3. Shrinkage in foreign sources of timber supply.
4. Fall in the value of land in Britain.
5. Livelihood for the country population.
6. Recreation for the towns' folk.
7. Aid in defending the country against invasion.
8. National insurance.
9. Abatement of smoke nuisance in towns.

It may be objected that much of what is here set down has been

heard before. Private Forestry and its failure in Britain is no new story. But I do not know that the claims of National Forestry have ever received the consideration they now merit, nor indeed could they. It is only within the last few years that the financial position of National Forestry has become assured. When I studied in the forest schools of Europe a quarter of a century ago, National Forestry for England was not possible as a paying concern. To-day the country can borrow at 2 per cent. National forests will return 3 per cent. and upwards.

Pondering these things, the conclusion to a Colonist and a Forester is irresistible. England's great want at this time is National Forestry. And as one reckons up the gains—£20,000,000 more produced yearly in the country; 750,000 people kept on the land; a forest playground for every man, woman and child, with a fostering of the love of nature and the beautiful; less smoke: when one considers that this can be produced at no final cost to the public exchequer (probably a considerable gain), and that for a moderate extra cost we obtain strategic forests and a defensive forest militia—pondering, I say, these things, the strange puzzle of the present position becomes stranger and stranger.

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